Figure 1
Typical media server
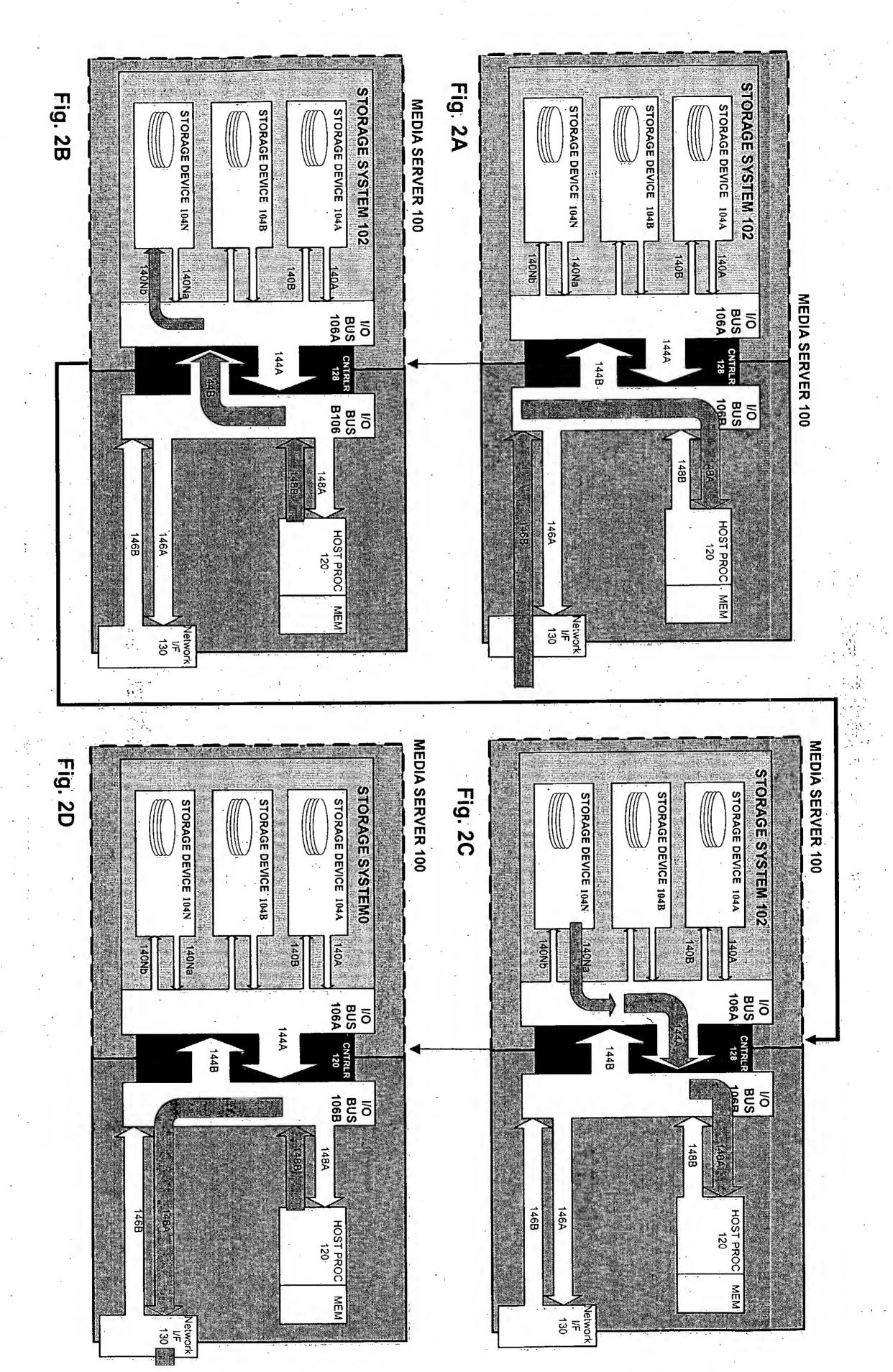
Fig. 2A

STORAGE SYSTEM 102

STORAGE DEVICE 104A
STORAGE DEVICE 104B
STORAGE DEVICE 104N

140A
140B
140Na
140Nb

I/O BUS 106A

144A

CNTRLR 128

I/O BUS 106B

148A
148B

146A
146B

HOST PROC 120   MEM

Network I/F 130

MEDIA SERVER 100

Fig. 2B

STORAGE SYSTEM 102

STORAGE DEVICE 104A
STORAGE DEVICE 104B
STORAGE DEVICE 104N

140A
140B
140Na
140Nb

I/O BUS 106A

144A

CNTRLR 128

I/O BUS 106B

148A
148B

146A
146B

HOST PROC 120   MEM

Network I/F 130

MEDIA SERVER 100

Fig. 2C

STORAGE SYSTEM 102

STORAGE DEVICE 104A
STORAGE DEVICE 104B
STORAGE DEVICE 104N

140A
140B
140Na
140Nb

I/O BUS 106A

144A

144B

CNTRLR 128

I/O BUS 106B

148A
148B

146A
146B

HOST PROC 120   MEM

Network I/F 130

MEDIA SERVER 100

Fig. 2D

STORAGE SYSTEM0

STORAGE DEVICE 104A
STORAGE DEVICE 104B
STORAGE DEVICE 104N

140A
140B
140Na
140Nb

I/O BUS 106A

144A
144B

CNTRLR 120

I/O BUS 106B

148A
148B

146A
146B

HOST PROC 120   MEM

Network I/F 130

MEDIA SERVER 100

Figure 2 Prior Art: Typical Digital Media Server
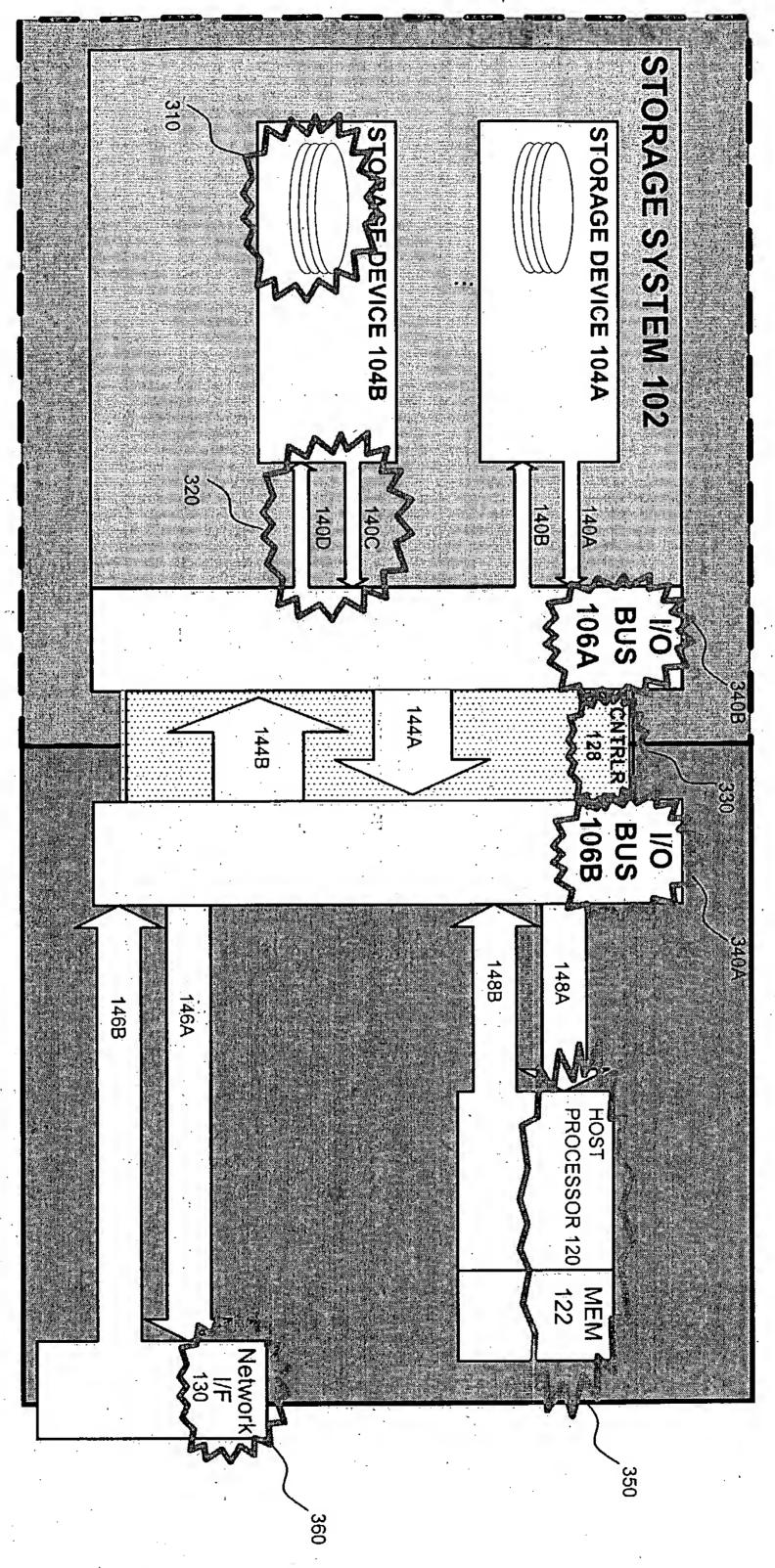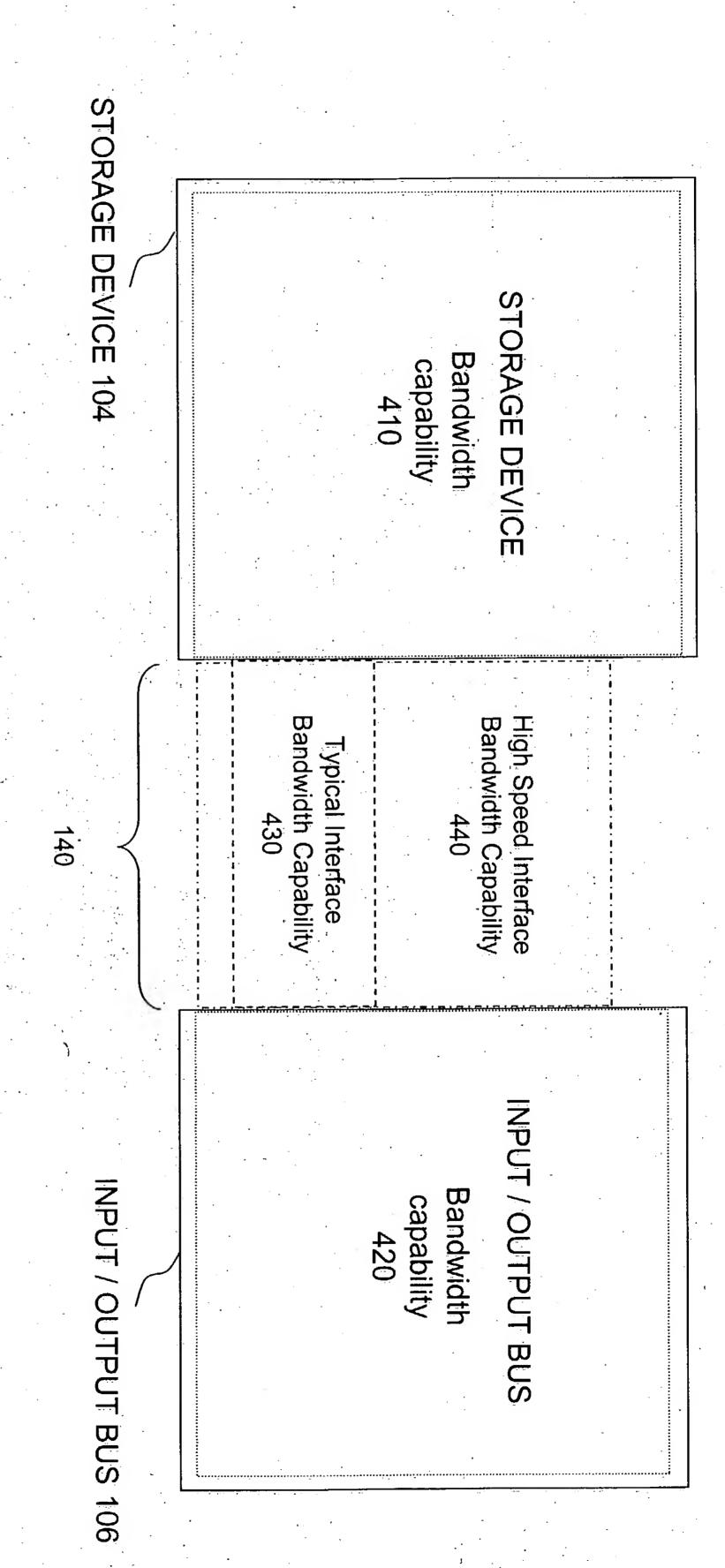
Figure 3 Potential Bottlenecks In a Typical Media Server

STORAGE DEVICE 104

STORAGE DEVICE
Bandwidth
capability
410

High Speed Interface
Bandwidth Capability
440

Typical Interface
Bandwidth Capability
430

140

INPUT / OUTPUT BUS
Bandwidth
capability
420

INPUT / OUTPUT BUS 106

Figure 4 INPUT/OUTPUT BUS THROTTLE

STORAGE DEVICE 104

HARD
DISK
180

IOPS = X
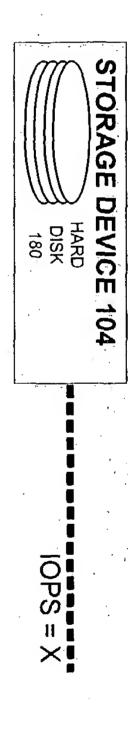
Figure 5A – Typical Input / Output Operations per Second

STORAGE DEVICE 104C

HARD
DISK
180C

IOPS = X

STORAGE DEVICE 104A

HARD
DISK
180A

IOPS = X

STORAGE DEVICE 104B

HARD
DISK
180B

IOPS = X

STORAGE DEVICE 104D

HARD
DISK
180D

IOPS = X

IOPS = 4X
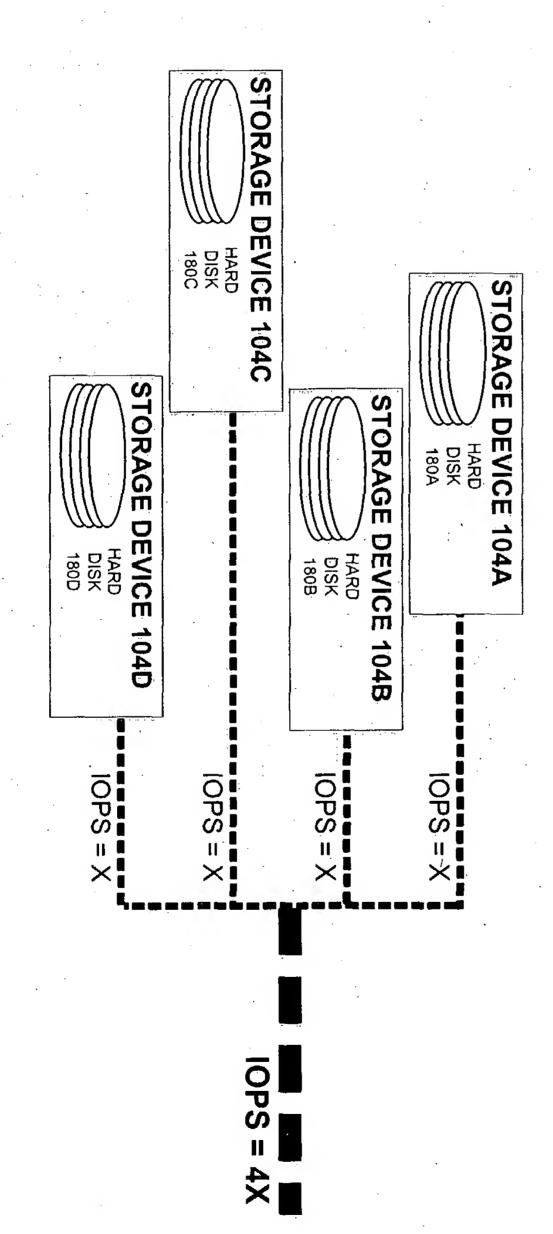
Figure 5B – RAID Input / Output Operations per Second
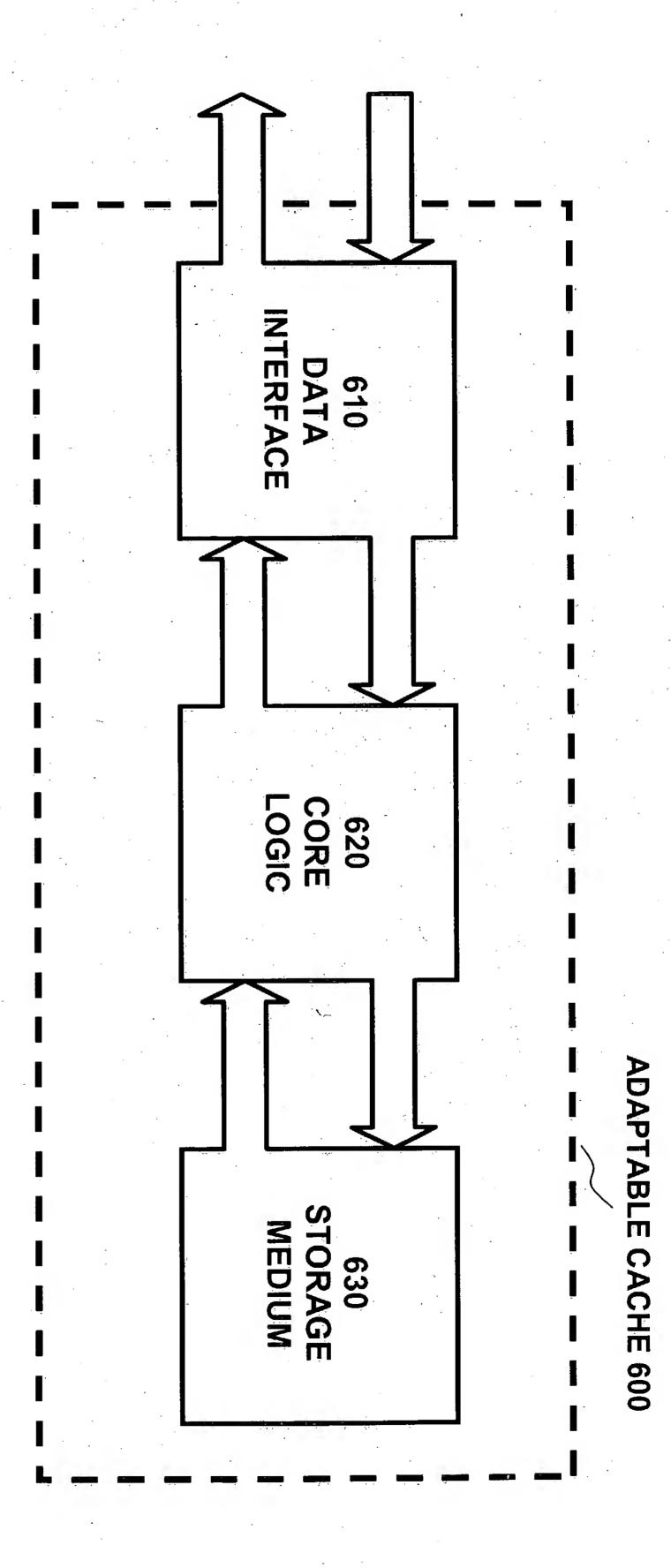
Figure 6A – Conceptual components of Invention

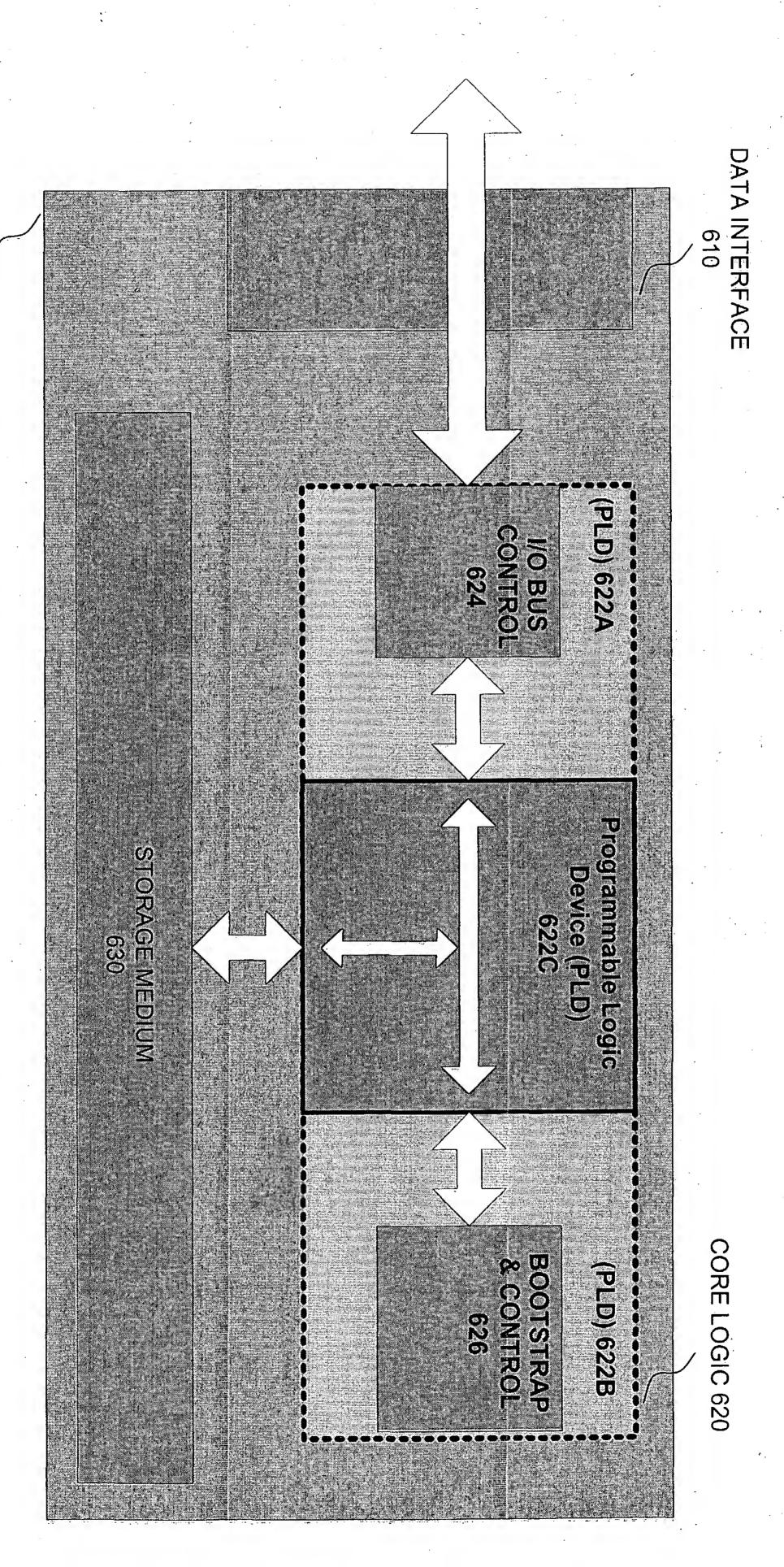610
DATA
INTERFACE

620
CORE
LOGIC

630
STORAGE
MEDIUM

ADAPTABLE CACHE 600

Figure 6B Logic data flow for preferred embodiments

ADAPTABLE CACHE
600

DATA INTERFACE
610

(PLD) 622A

I/O BUS
CONTROL
624

Programmable Logic
Device (PLD)
622C

STORAGE MEDIUM
630

(PLD) 622B

BOOTSTRAP
& CONTROL
626

CORE LOGIC 620

Figure 7

MEDIA SERVER 700

STORAGE SUBSYSTEM 102

STORAGE DEVICE 104A

STORAGE DEVICE 104B

140A
140B
140C
140D

I/O BUS 106A

CNTRLR 128

144A
144B

I/O BUS 106B

148A
148B
710A
710B
146A
146B

HOST PROCESSOR 120

MEM 122

Adaptable Cache 600

Network Interface 130

801 Request for Resource Received at Network Interface

802 Forward Request to Processor

803 Formulate Storage Access Request for Requested Asset

804 Is Resource Available on Adaptable Cache

Yes

No

805 Resource Returned To Host Processor

806 Forward Request to Storage Device

807 Storage Device Returns Resource

808 Format and Deliver Requested Asset

Figure 8

Figure 9

Adaptable Cache Monitors Requests — 901

Determine if Asset Persists on Adaptable Cache — 902

Evaluate Data Request — 903

Cache Data — 904

Yes

No

Pull/Store Requested Data — 905

Notify Applications of Updated Content — 906

Update Parameters — 907

Resource Request Received at Network Interface — 1001

Adaptable Cache Monitors Requests — 1002

Is Resource Available on Adaptable Cache — 1003

Yes

Host Processor Requests Resource from Adaptable Cache — 1004

Adaptable Cache Returns Resource — 1005

Application Receives Resource

No

Host Processor Requests Resource from Storage Device — 1006

Seek to block — 1007

Read block — 1008

Transmit block — 1009

Transmission complete — 1010

No

Yes

Return requested data loop

Figure 10

Figure 11

Figure 12

1201 — Resource Request Received at Network Interface

1202 — Determine if Asset Persists at Network Interface

Is Resource Available on Adaptable Cache

1203 — Adaptable Cache Returns Resource

Yes

No

1204 — Request Forwarded to Host Processor

1205 — Host Processor Requests Data From Storage Device

1206 — Storage Device Returns Resource

1207 — Format and Deliver Requested Asset

Figure 13

Figure 14

1401 Resource Request Received at Network Interface

1402 Request Forwarded to Host Processor

1403 Host Processor Sends Request to Storage Device

1404 Is Resource Available on Adaptable Cache

Yes

No

1405 Adaptable Cache Returns Resource

1406 Request Forwarded to Storage Device

1407 Storage Device Returns Resource

1408 Application Receives Resource

Figure 15

1601 Resource Request Received at Network Interface

1602 Request Forwarded to Host Processor

1603 Host Processor Sends Request to Storage Device

1604 Is Resource Available on Adaptable Cache

Yes

No

1605 Adaptable Cache Returns Resource

1606 Adaptable Cache Precludes Storage Device From Servicing Request

1608 Application Receives Resource

1607 Storage Device Returns Resource

Figure 16